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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/938,310	08/24/2001	Nao Fujita	011059	1067

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EXAMINER

WILSON, DONALD R

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 02/05/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/938,310

Applicant(s)

FUJITA ET AL.

Examiner

D. R. Wilson

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-- Th MAILING DATE of this communication appears on th cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 4-14 and 25-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 15-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Restriction/Election of Species Requirement

1. Applicant's election without traverse in Paper No. 8 is acknowledged for the inventions of Group I, Claims 1-2, 15-24 (for vinyl polymers contacted with an oxidizing agent), and Claims 3-6¹, and the species of:

- a. poly(butyl acrylate as the vinyl polymer,
- b. cuprous bromide as the transition metal complex in the polymerization catalyst,
- c. 7-octene group as the terminal alkenyl groups present, and
- d. oxygen as the oxidizing agent.

2. Claims 7-14 and 25-34, and Claims 1-2, 15-24 (for vinyl polymers contacted with a reducing agent) are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention. Claims 4-6 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected specie of the invention. Claims 1-3 and 15-24 (for vinyl polymers contacted with an oxidizing agent) are under consideration.

Objection to Claims

3. The language of Claims 1-2 and 18 are objected to because they include steps withdrawn from consideration due to a restriction requirement. This objection can be overcome by deleting "or a reducing agent" from the claims. Appropriate correction is required.

Objection to New Matter

4. The amendment filed 8/24/01 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Amended Claim 24 recites a polyamide compound as a catalyst ligand, for which there appears to be no basis. Original Claim 24 recites a polyamine compound. In the prior art rejections below the Examiner has assumed that applicant intended to recite polyamine compound in the amended claim.

¹ Applicant is correct i pointing out that the claims of Group I include Claims 3-6, as opposed to Claims 7-14. Any inconvenience to applicant over this inadvertent error is regretted.

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5. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112, First Paragraph

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. ***Claims 1-3 and 15-24 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for purification of vinyl polymers obtained by atom transfer polymerization (ATRP), using the exemplified oxidizing agents, does not reasonably provide enablement for purifications using the scope of oxidizing agents set forth in the specification and claims.*** The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. Many of the agents set forth in the specification and claims as suitable oxidizing agents are known to cause reactions of vinyl group containing polymers including polymerization, cross-linking, grafting, double bond addition, formation of ozonides etc., and it is not seen that purification using oxidizing agents of the scope set forth would be effective in purifying polymers for the uses set forth in the specification. Undue experimentation would be required to identify conditions, if they exist, for purification of vinyl polymers with the scope of many of the oxidizing agents disclosed.

8. ***Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.*** The subject matter in question is that objected to as new matter above.

Claim Rejections - 35 USC § 112, Second Paragraph

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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10. **Claims 1-3 and 15-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

11. The languages of Claims 1-2, 15 and 17 are indefinite because the term "obtainable" makes it unclear whether or not the vinyl polymer is, or is not, obtained by the method of the claims. This rejection could be overcome by substituting "obtained" for "obtainable".

12. Claims 22 and 23 are indefinite because "the transitional metal catalyst" lacks antecedent basis.

Claim Rejections - 35 USC § 102(b)/§ 103(a)

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. **Claims 1, 3, 18, 19/1, 20/1, 21/1, 22/1, 23/22/1 and are 24/1 rejected under 35 U.S.C. 102(b) as anticipated by Roos.**

17. Roos discloses methods of making polymers using ATRP, oxidizing the catalyst following polymerization, and removal of the oxidized catalyst by filtration (abstract). If not removed the transition metal catalysts discolor the polymer and articles made from them (col. 1, lines 50-54). Preferred

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monomers include butyl acrylate (col. 4, lines 1-7, col. 47-49). Preferred catalysts include cuprous bromide (col. 9, lines 46-49) and polyamine ligands (col. 10, lines 55-63), which are also exemplified in the examples (col. 14, lines 43-46). The polymers produced have a molecular weight in the range of 1000 to one million, with a narrow molecular weight distribution (col. 13, lines 33-20). A number of polymers having a molecular weight distribution less than 1.8 are exemplified in the examples. Oxidation of the catalyst is done with well known oxidation agents such as oxygen and peroxides, with oxidation by atmospheric air being preferred (col. 13, lines 27-34).

18. Claims 1-3 and 15-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roos as applied to Claims 1, 3, 18, 19/1, 20/1, 21/1, 22/1, 23/22/1 and are 24/1 above, and further in view of Nakagawa.

19. Roos is deficient in not disclosing ATRP polymers containing vinyl end groups such as in the elected species of polymer and end-groups. However, the preparation of poly(butyl acrylate) with 7-octene end-groups by an ATRP method using cuprous bromide catalyst and a polyamine ligand is well known as for instance is exemplified in Example 5 of Nakagawa. The polymer has a molecular weight of 13,100 and a molecular weight distribution of 1.22. It would have been obvious to one of ordinary skill in the art to employ the purification procedure disclosed by Roos to other ATRP polymers such as taught by Nakagawa in order to overcome the discoloration problems known to exist with ATRP polymers containing catalyst residues.

Objection to Title

20. The title of the invention is not descriptive of the invention being claimed. A new title is required that is clearly indicative of the invention to which the claims are directed. A title such as "PURIFICATION WITH OXIDIZING AGENTS OF VINYL POLYMERS OBTAINED BY ATOM TRANSFER RADICAL POLYMERIZATION" is suggested.

Art of Interest/Technological Background

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Barkac is representative of a number of patents disclosing oxidation of ATRP catalysts *in situ* prior to use and could be used in a rejection of the instant claims.

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Future Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. R. Wilson whose telephone number is 703-308-2398.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 703-308-2450. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications. The unofficial direct fax phone number to the Examiner's desk is 703-872-9029.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-2351.

A handwritten signature in black ink, appearing to read 'DR Wilson', with a long horizontal flourish extending to the right.

D. R. Wilson
Primary Examiner
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